GSE Intégration

GSE INTEGRATION INSTALLATION MANUAL

For photo-voltaic systems partially covering the roof

V 7.5

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Presentation of system

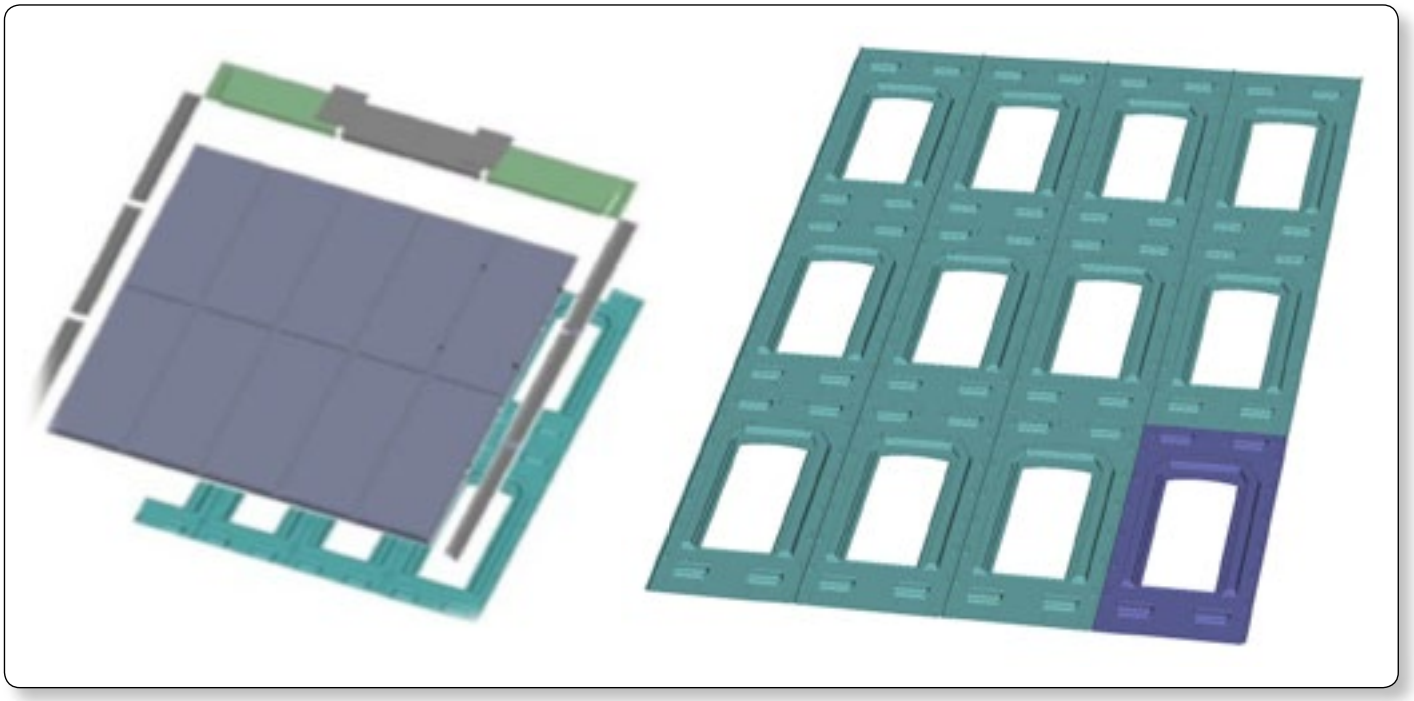
GSE INTEGRATION SYSTEM

The GSE Integration system is used to install modules on all types of roofing, in partial coverage (channel tiles, mechanical, flat, slates), on new buildings or buildings being renovated.

The system may be installed in portrait format or in landscape format, with a specific mounting plate for each format, on both small installations (less than 3 kWp) and large roofs (several hundred kWp).

The GSE Integration system may be installed on wood or metal structures and mounted on battens or lathing. It can also be mounted directly on common rafters and can be installed on slopes between 15° and 50°.

The GSE Integration system is guaranteed for 10 years, providing the installation recommendations given below are respected. The system does not require much maintenance, except for regular cleaning of the solar panels.



GSE Integration

Contents of kit

ASSEMBLY ACCESSORIES

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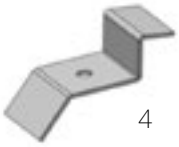
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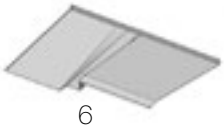
EDGE JOINERS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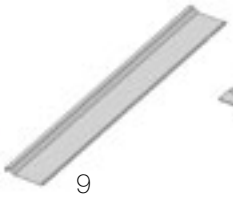
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MOUNTING PLATES

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WATERPROOFING

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17

ASSEMBLY ACCESSORIES

1 - stainless umbrella screw
2 - neoprene seal
3 - double clamps
4 - single clamps
5 - hook plates

EDGE JOINERS

6 - roof angle joiners
7 - roof crest joiner
8 - pop rivet
9 - lateral edge joiner
10 - junction joiner
11 - seal

MOUNTING PLATES

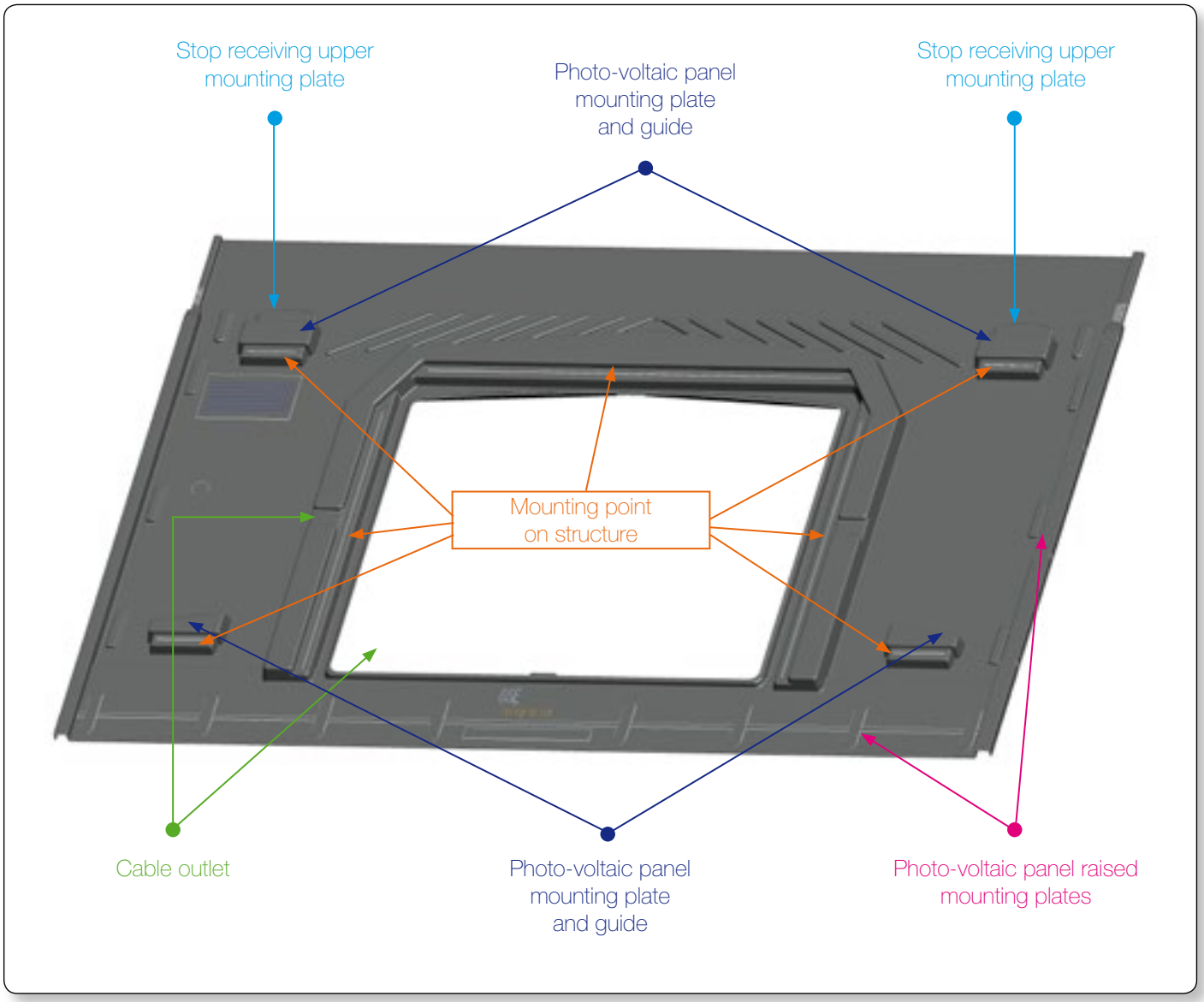
12 - stainless umbrella screw
13 - portrait format mounting plate
14 - landscape format mounting plate

WATERPROOFING

15 - waterproofing strip
16 - roll of precompressed seal strip
17 - under-roof screen

Mounting plate 1.0

PHOTO-VOLTAIC PANELS - LANDSCAPE FORMAT


Stop receiving upper mounting plate
Photo-voltaic panel mounting plate and guide
Stop receiving upper mounting plate
Mounting point on structure
Cable outlet
Photo-voltaic panel mounting plate and guide
Photo-voltaic panel raised mounting plates

Mounting plate 1.1

PHOTO-VOLTAIC PANELS - PORTRAIT FORMAT

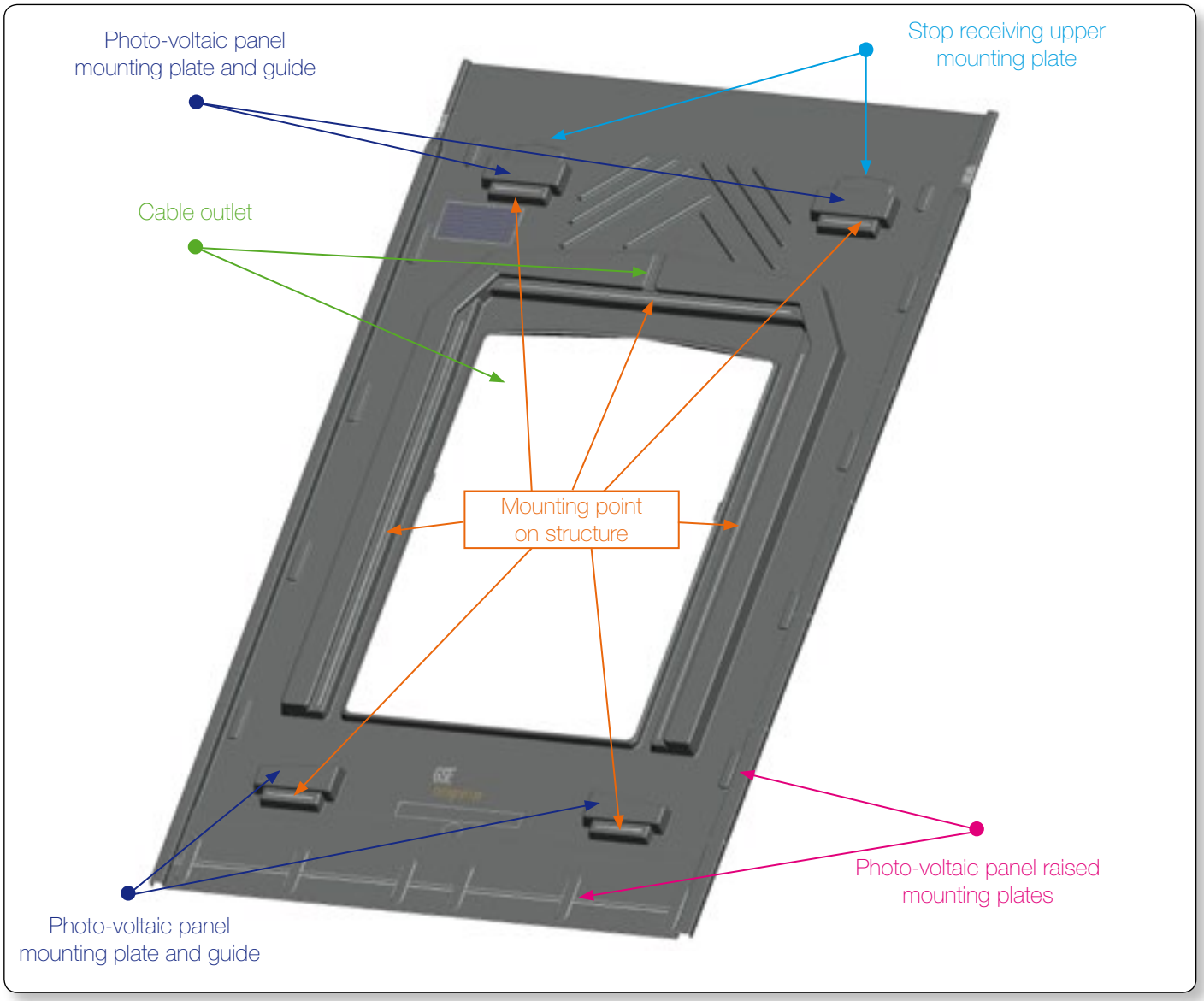


Photo-voltaic panel mounting plate and guide
Stop receiving upper mounting plate
Cable outlet
Mounting point on structure
Photo-voltaic panel raised mounting plates
Photo-voltaic panel mounting plate and guide

Tools required for installation

CHALK LINER

PERCUSSION SCREWDRIVER

MEASURING TAPE

Installing mounting plates 1.0

ESSENTIAL POINTS TO OBSERVE WHEN INSTALLING MOUNTING PLATES AND CLAMPS

MAX. SPACING BETWEEN RAFTER CENTRES: 600 mm
MAX. SPACING BETWEEN BATTEN CENTRES: 350 mm
MAX. SPACING BETWEEN PURLIN CENTRES: 500 mm

MINIMUM BATTEN THICKNESS:
15 mm for rafter centres spacing 400 mm
27 mm for rafter centres spacing 600 mm

EXPANSION

Expansion computing

Expansion coefficient of PP20T 0.75 to 1.25 x 10-4 / K ..... 1.00 10-4 / K

Length ..... 2.00 m

Delta Température 20 à 80° ..... 60.00°C
Expansion value ..... 13 mm

Delta Température 20 à -20° ..... 40.00°C
Expansion value ..... 8.00 mm

Coefficient dilatation du bois 0.5 x 10-4 / K ..... 0.5 10-4 / K

Longueur ..... 2.00 m

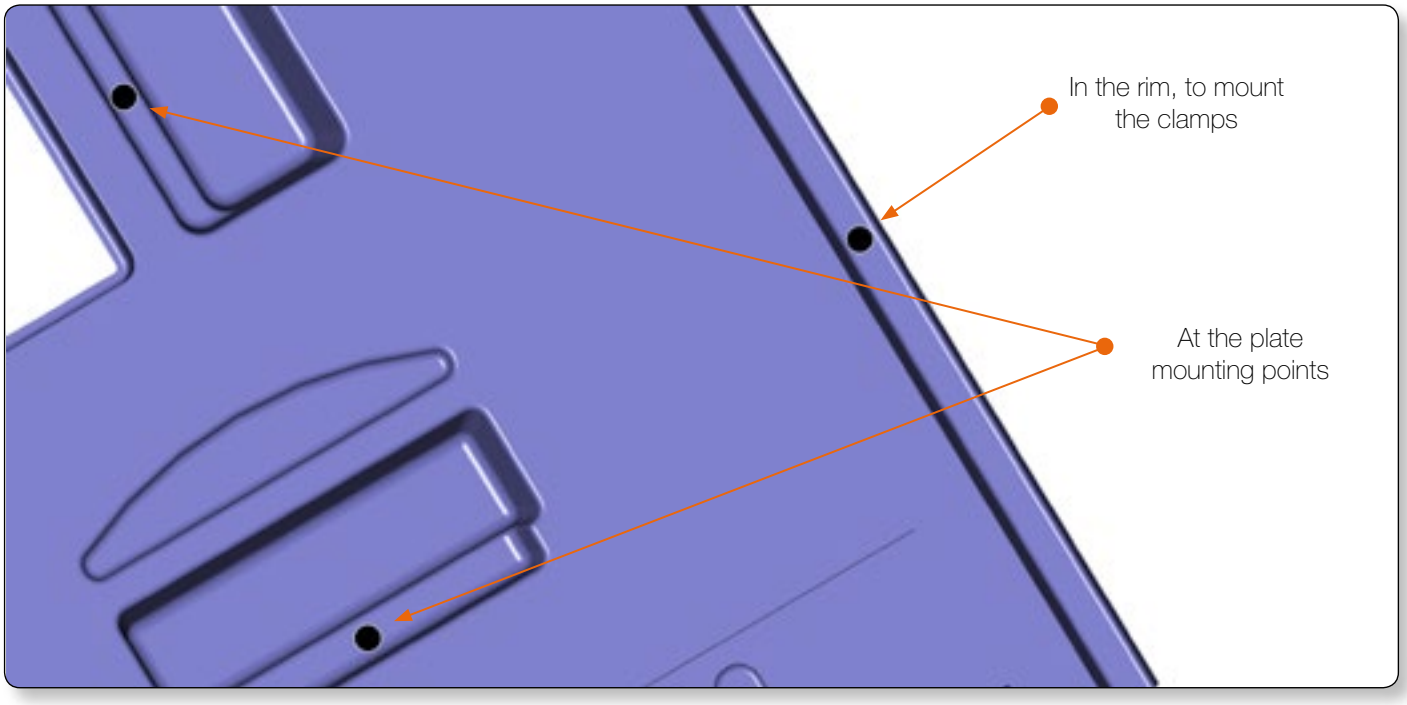
Delta Température 20 à 80° ..... 60.00°C
Valeur de dilatation ..... 6.5 mm

Delta Température 20 à -20° ..... 40.00°C
Valeur de dilatation ..... 4.00 mm

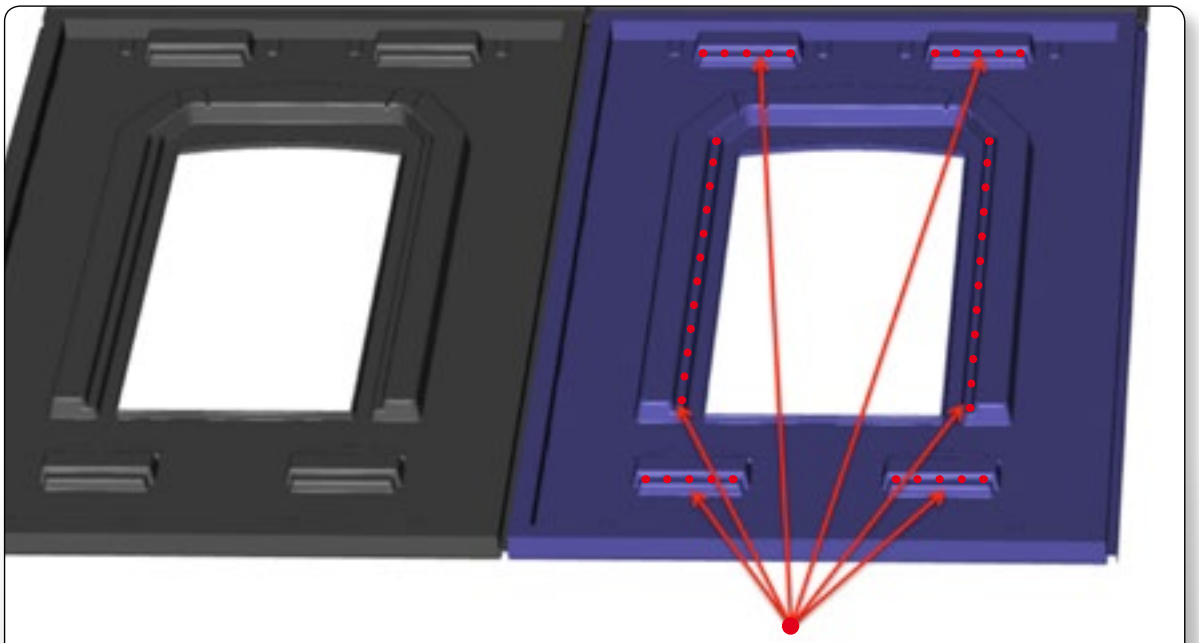
The difference in expansion between the mounting plate material and wood necessitates drilling an 8 mm hole in the rim, at the clamp mounting points and also at the points where the mounting plate is screwed to the structure, using the 5.5 mm diameter screws, supplied.

Installing mounting plates 1.1

DRILL AN 8 mm HOLE



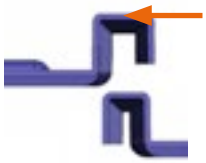
INSTALLING THE MOUNTING PLATES



Attach the mounting plate at 6 points, in the recesses in the studs and in the central protection (points shown by red dots)

Installing mounting plates 1.2

INSTALLING THE CLAMPS



(fig:2)

1

2

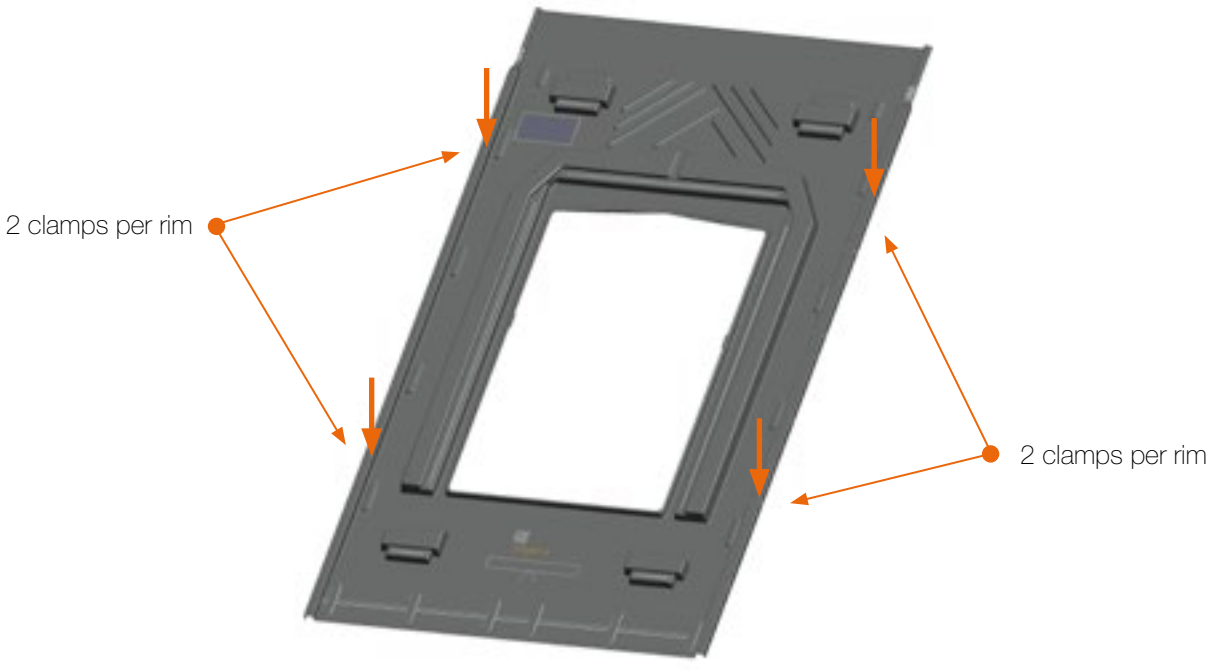
3

The clamps are only mounted on the mounting plate rim (fig:2)
Mount the clamp (3) using the stainless self-tapping screw (1) (supplied complete with grey EPDM washer). Do not use steel screws.
It is essential to install the black EPDM seal (2) (supplied) under the clamp (between the mounting plate and the clamp).
The rims are only drilled to mount the clamps (no other holes are drilled)

A screw, diameter 5.5 mm (supplied in the kit) should be screwed in at 1800 rpm, with a loading of 30 kg.
Result should be as shown in DTU 40.35 or DTU 40.36

Insufficient correct Too much

MOUNTING THE RIMS

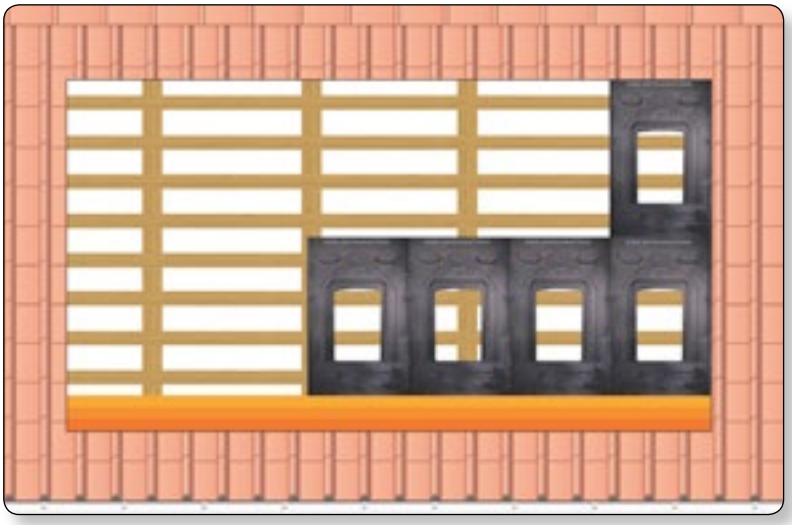


Installing mounting plates 1.3

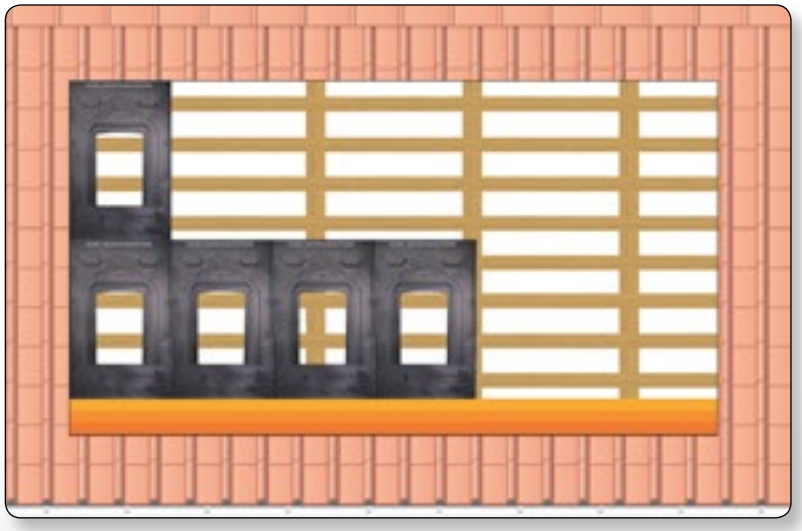
IMPORTANT

- **When mounting the plates or clamps, you must be attached to the structure.**
- **Do not drill holes in water flow zones.**

ORIENTATION



Panel mounting plates should preferably be installed from right to left, but can also be installed from left to right.

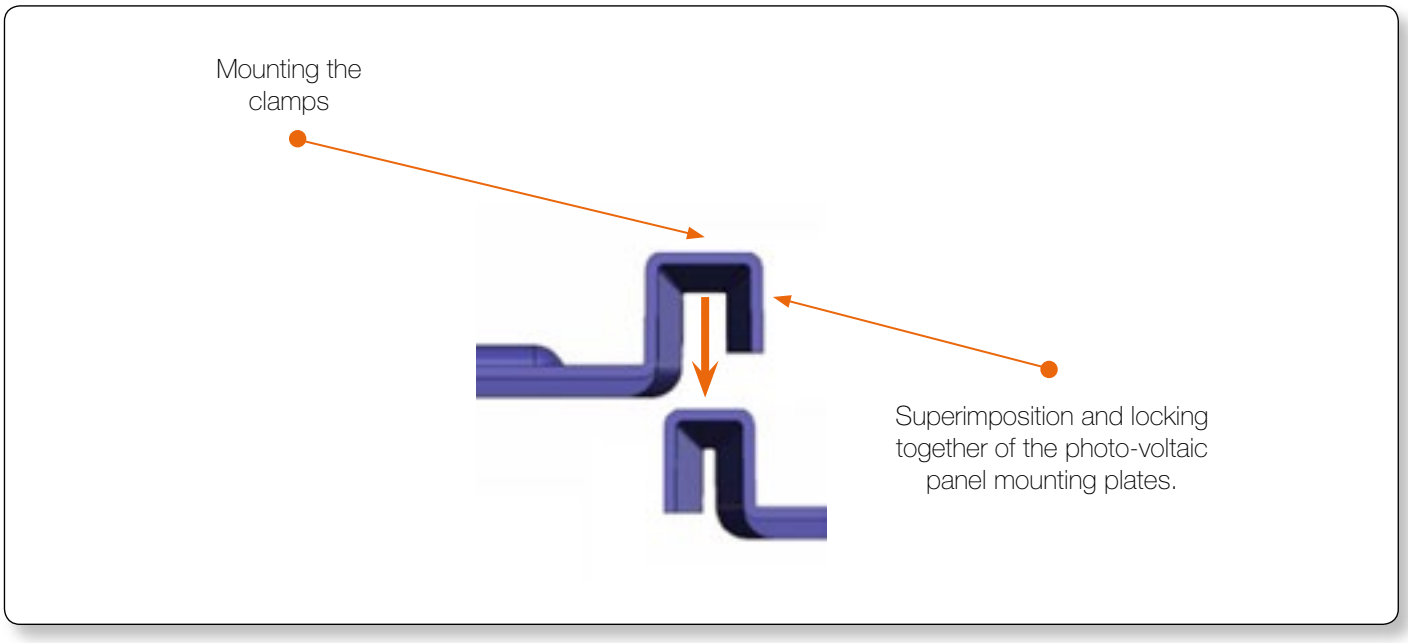


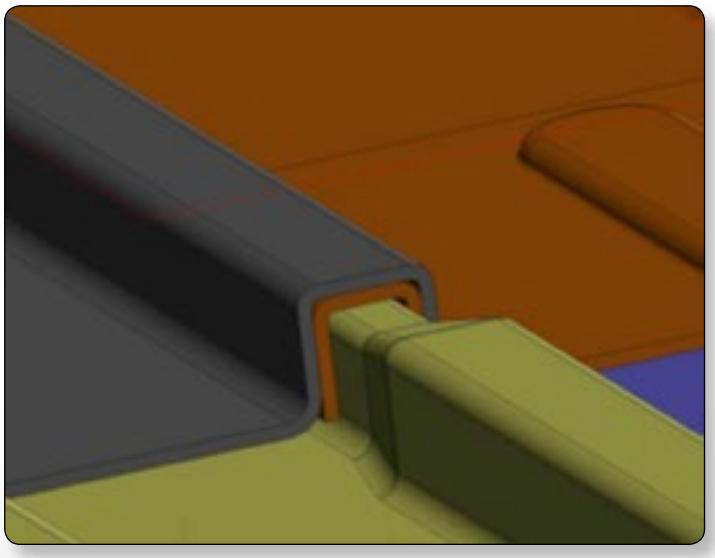
- The photo-voltaic field rating must meet the requirements of standard NF C 15-100, of ETU guide C15-712 and of the practical guide issued by the French authorities, to ensure safety and the proper operation of the photo-voltaic system.

Installing mounting plates 1.4

NOTE

Care should be taken to ensure that the mounting plates overlap properly, for the interlocking system to be waterproof.





View of 4 mounting plates, locked together

Installing mounting plates 1.5

ADJUSTING GSE INTEGRATION PLATES

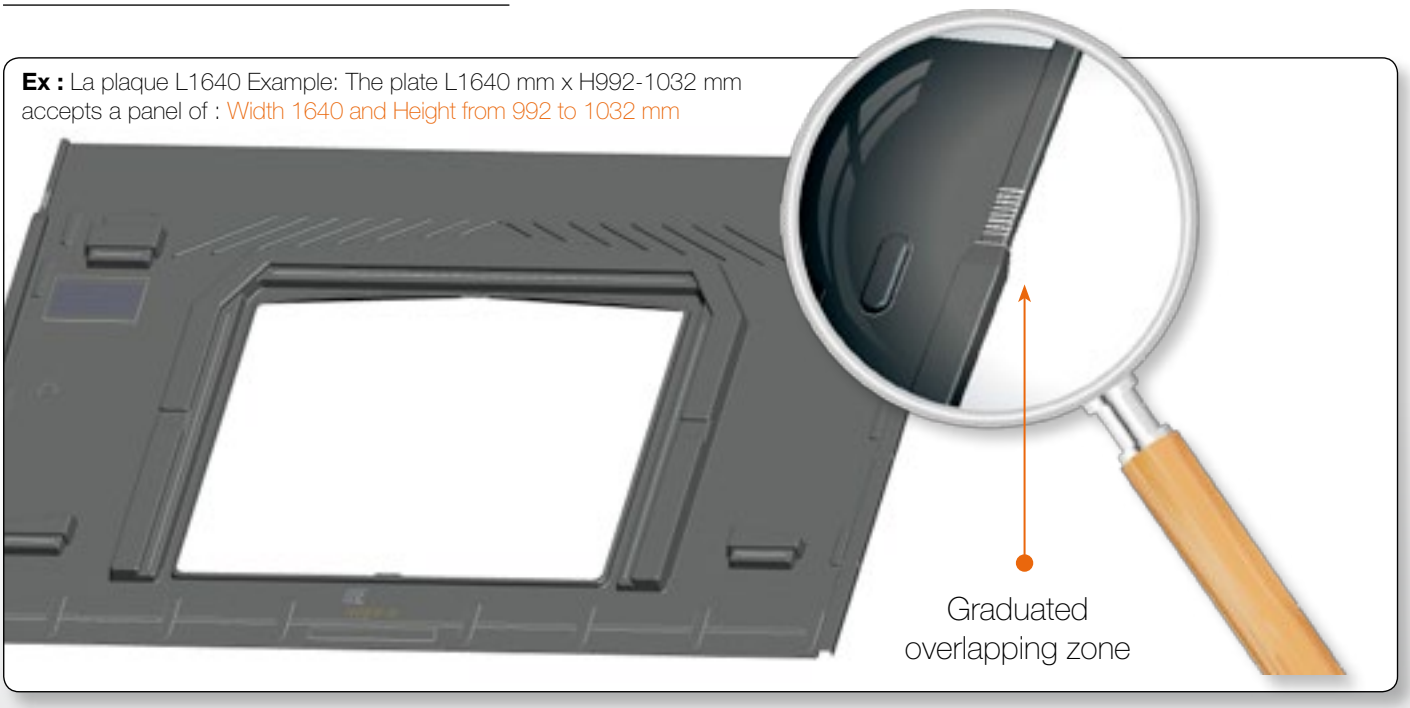
GSE Integration plates are adjustable* (in the direction of the slope) as a function of panel size. In order to facilitate the adjustment of the GSE Integration panels, graduations are marked on the overlapping zone.

PORTRAIT FORMAT PANEL

Example: The plate H1640-80 mm x L992 mm accepts a panel of :
Height from 1640 to 1680 mm
Width 992 mm

LANDSCAPE FORMAT PANEL

Ex : La plaque L1640 Example: The plate L1640 mm x H992-1032 mm accepts a panel of : Width 1640 and Height from 992 to 1032 mm



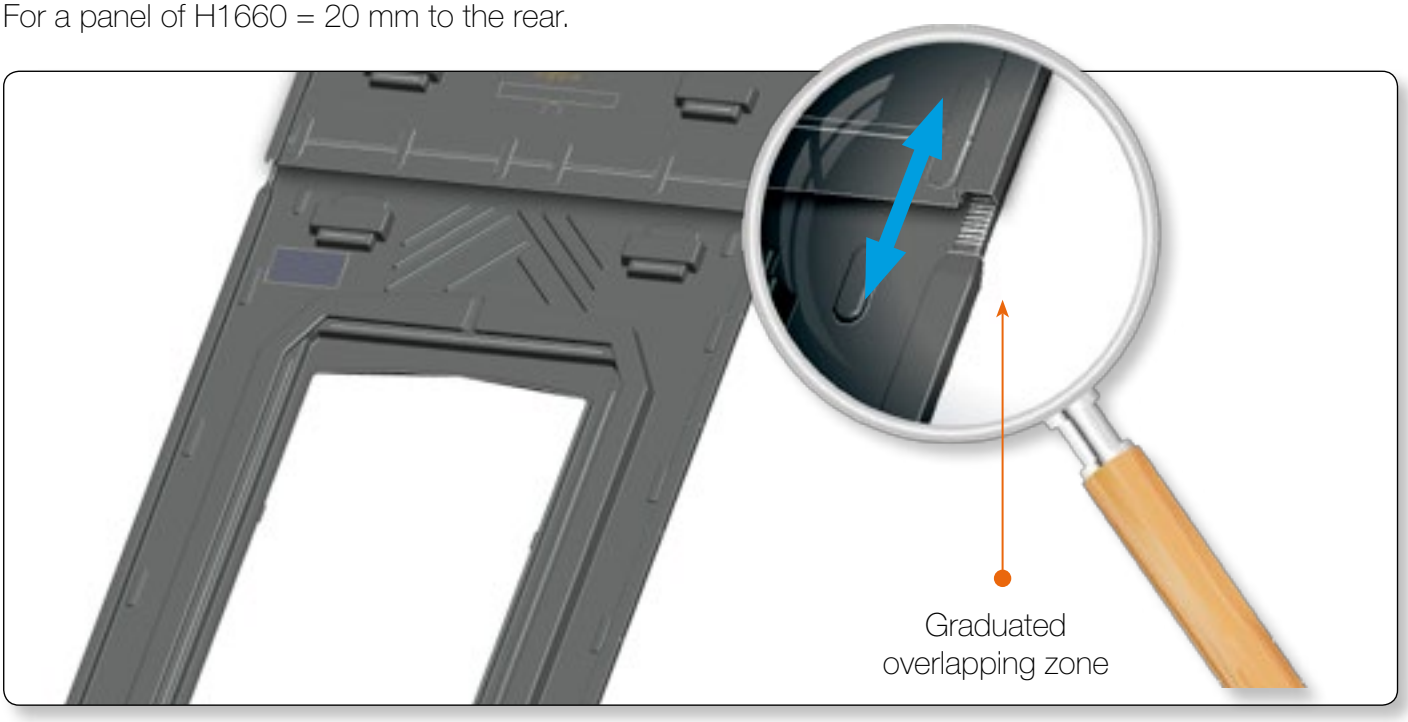
*Please refer to sizes table

Installing mounting plates 1.5

ADJUSTMENT EXAMPLE

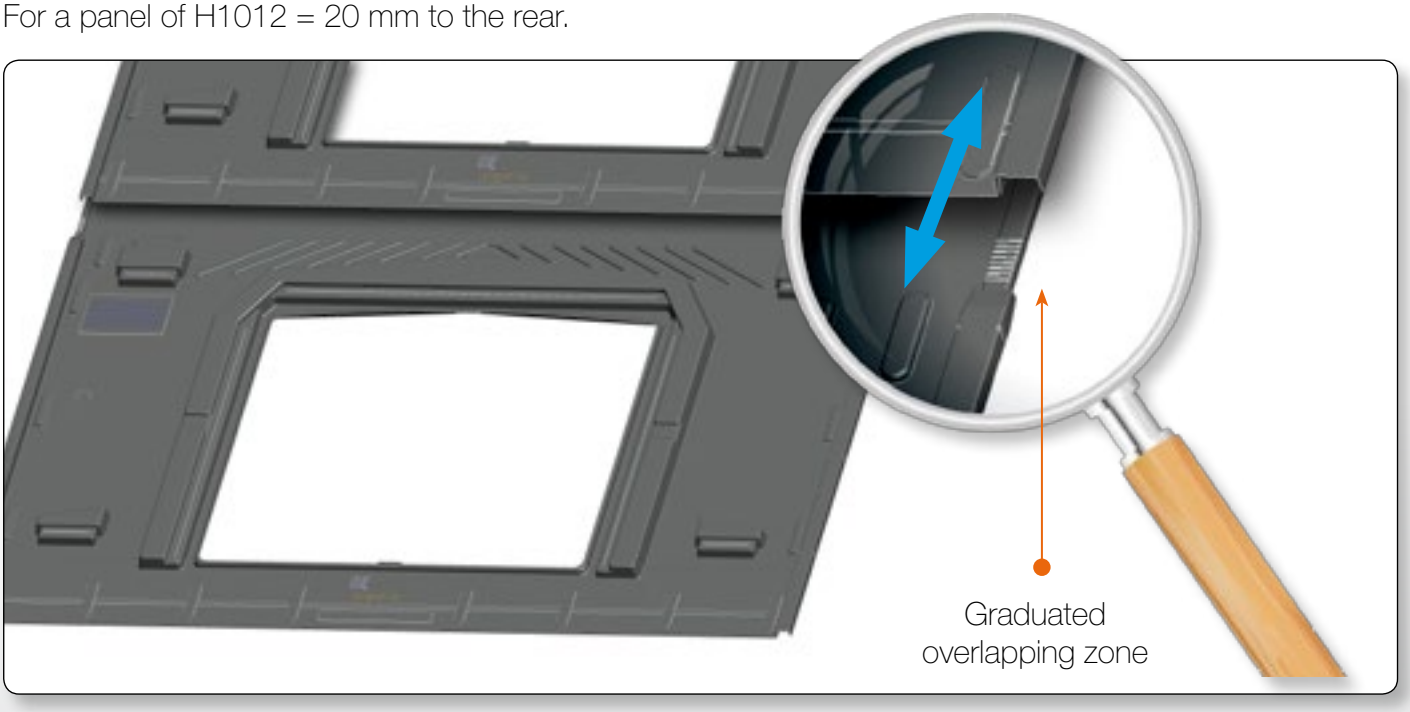
PORTRAIT FORMAT PANEL (H1640-80mm X L992mm)

For a panel of H1650, the plate should be positioned 10 mm to the rear.
For a panel of H1660 = 20 mm to the rear.



LANDSCAPE FORMAT PANEL (L1640mm X H992-1032mm)

For a panel of H1002 the plate should be positioned 10 mm to the rear.
For a panel of H1012 = 20 mm to the rear.

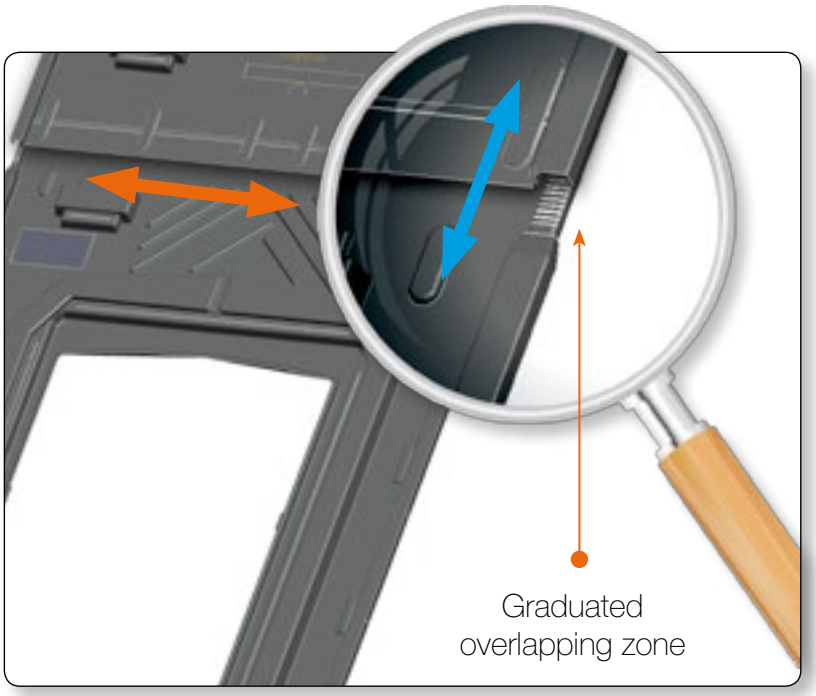


Acceptable tolerance per model

ACCEPTABLE TOLERANCES FOR PHOTO-VOLTAIC PANELS ON OUR GSE INTEGRATION PLATES

PORTRAIT FORMAT PANELS

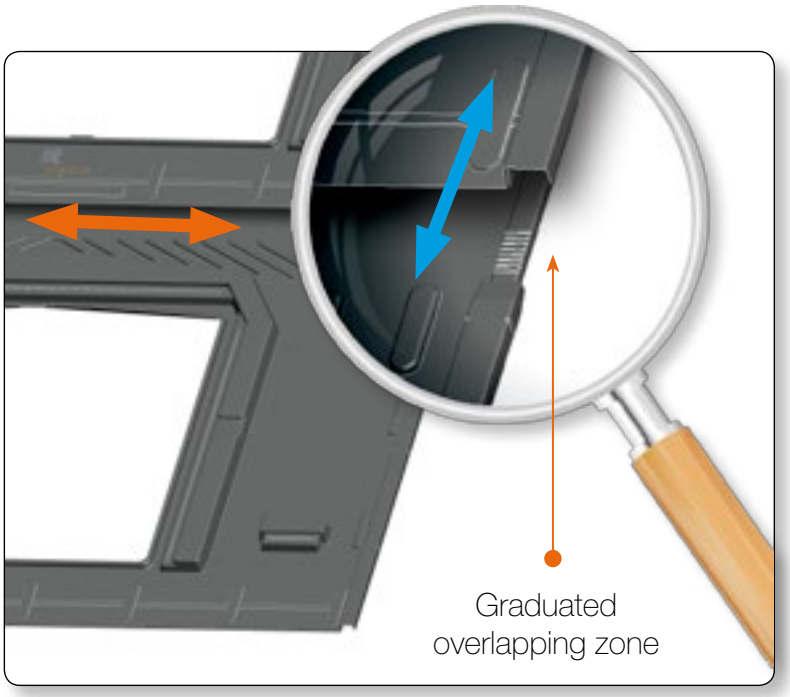
	PANEL TOLERANCES	
MODEL	WIDTH (mm)	HEIGHT (mm)
1640-80/992	987-993	1600-1680
1640-80/1001	996-1002	1600-1680
1580-1620/808	803-809	1540-1620
1575-1615/1082	1077-1083	1535-1615
1575-1615/1046	1041-1047	1535-1615
1575-1615/1069	1064-1070	1535-1615



Height tolerance Width tolerance

LANDSCAPE FORMAT PANELS

	PANEL TOLERANCES	
MODEL	WIDTH (mm)	HEIGHT (mm)
1640/992-1032	1635-1641	952-1032
1650/992-1032	1645-1651	952-1032
1660/992-1032	1655-1661	952-1032
1670/992-1032	1665-1671	952-1032
1675/992-1032	1670-1676	952-1032
1680/992-1032	1675-1681	952-1032
1580/808-848	1575-1581	768-848
1575/1082-1122	1570-1576	1042-1122
1559/1082-1122	1554-1560	1042-1122

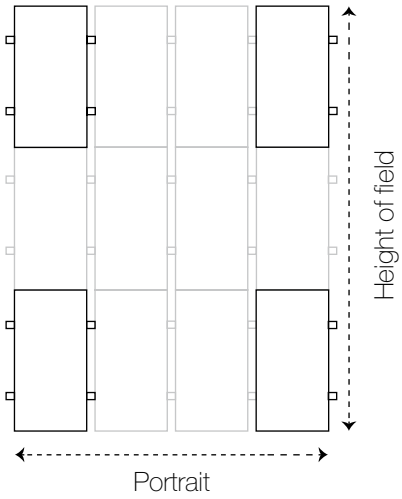


Height tolerance Width tolerance

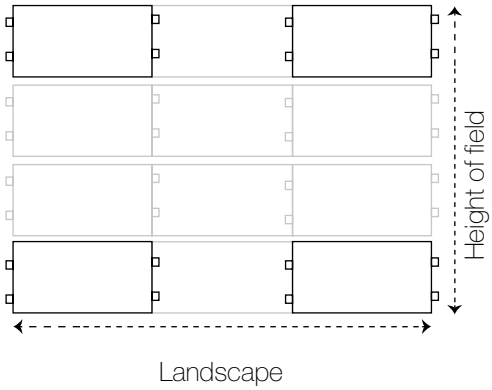
Installation phases 1.0

The under-roof screen must be approved for roofing, classified E1 or pending technical approval and classified W1 as per standard EN13859-1. The under-roof screen must be installed in compliance with French building regulations CSTB 3651-2.

PREPARATION OF ROOFING



Calculate the area
of your photo-voltaic field

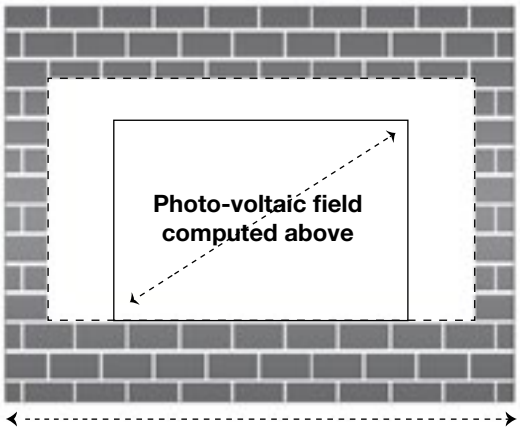


1) Remove the roofing elements over the area computed above.

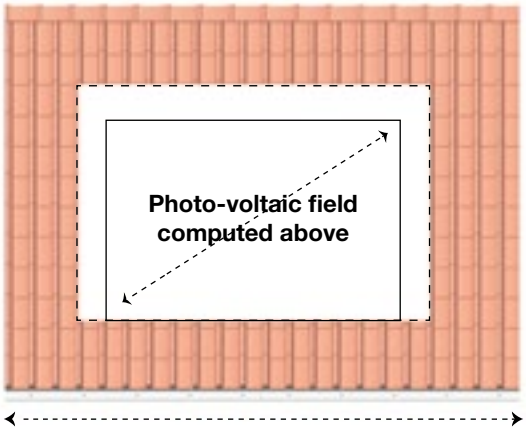
2) Remove one extra row of tiles on the right and on the left (two rows for slates or flat tiles).

3) Then remove the roofing elements over the height computed above.

4) Remove one more row of tiles at the top **(two rows for slates or flat tiles).**



slate roof :
2 more rows removed



tile roof :
1 more row removed

Installation phases 2.0

INSTALLING THE WATERPROOFING STRIP

2.1) In the case of a shallow slope or thick roofing elements (e.g. channel tiles) or very shaped roofing elements, in order to avoid standing water, install two 10 cm strips over the batten supporting the lowest row of tiles, over the entire width of the field. The strips should be sufficiently thick to enable the water to run off properly.

2.2) Apply the roll of waterproofing strip (preferably self-adhesive) on the strips or batten.

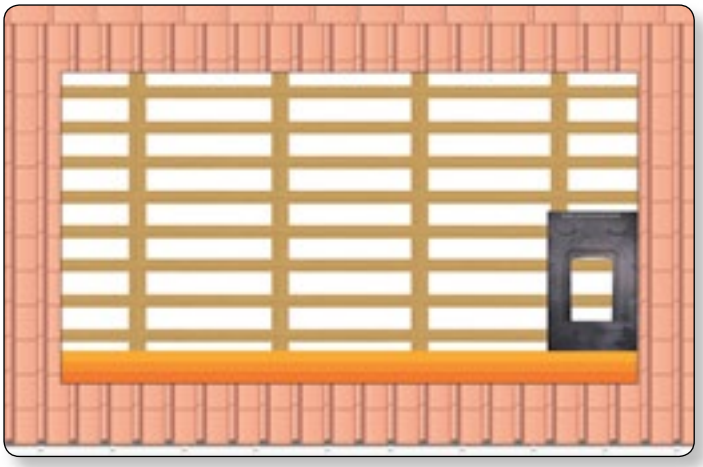
2.3) Fold back the upper edge of the waterproofing strip around 2 cm.

2.4) Fold back the right and left ends in the same way.

2.5) Firmly press the waterproofing strip onto the first row of tiles, pressing it down smoothly and carefully (ensure that you don't create any water trap zones)

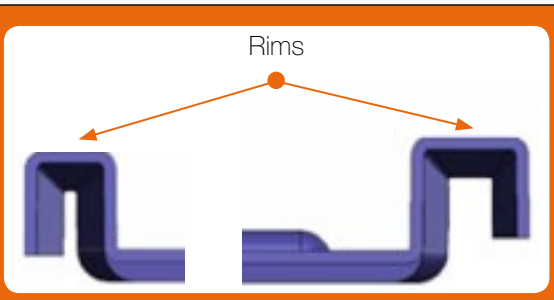
2.6) Installation on channel tiles requires a waterproofing strip 45 to 56 cm wide. (standard width 28 cm)

INSTALLING THE FIRST ROW OF MOUNTING PLATES



3.1) Using the chalk liner, mark a line on the waterproofing strip, parallel to the battens and 15 cm to 20 cm below the top edge of the waterproofing strip.

3.2) Position the first mounting plate in the bottom right-hand corner of the uncovered area, aligned with the chalk liner mark. Install the mounting plate *(see mounting recommendations on pages 9 to 13).*



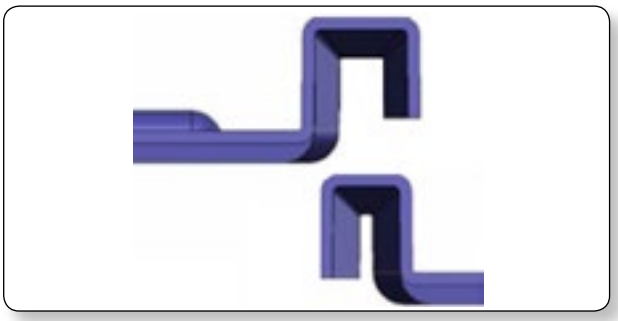
3.3) Using red chalk or a red line marker, mark the various points at which the rims will be over the battens or purlins on which the mounting plates are to be fixed, and the clamps used to mount the photo-voltaic panels.

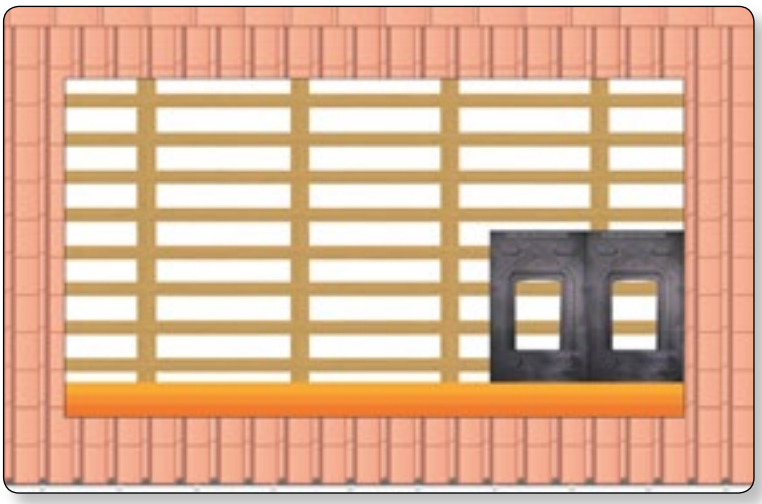
(See mounting recommendations, pages 9 to 13)

Installation phases 3.0

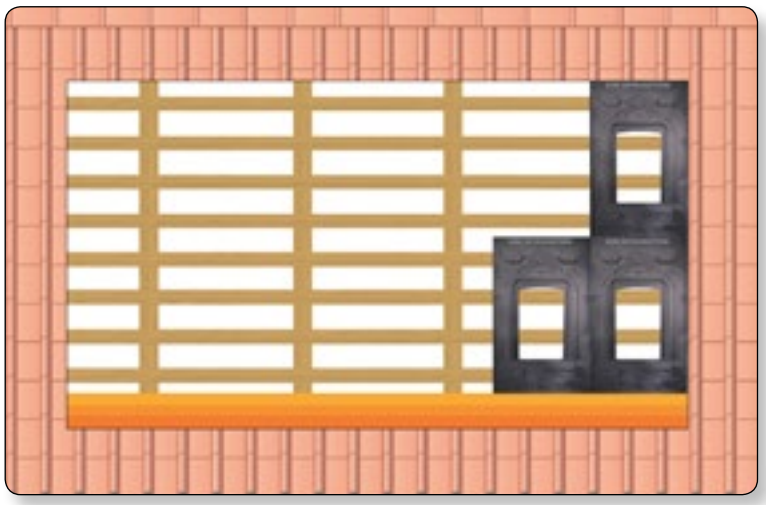
INSTALLING THE FIRST ROW OF MOUNTING PLATES

Place, the second mounting plate next to the first one, taking care to plug the rims together properly. Proceed in the same way for the remaining mounting plates.





INSTALLATION THE FOLLOWING ROWS OF MOUNTING PLATES



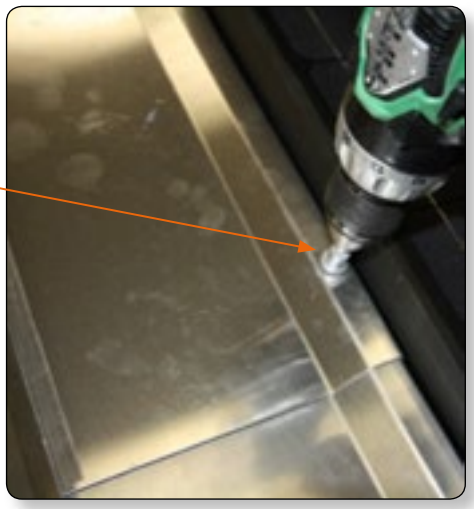
Install the second row of mounting plates from right to left. The top mounting plate should just overlap the lower mounting plate, until in contact with the dedicated stops.

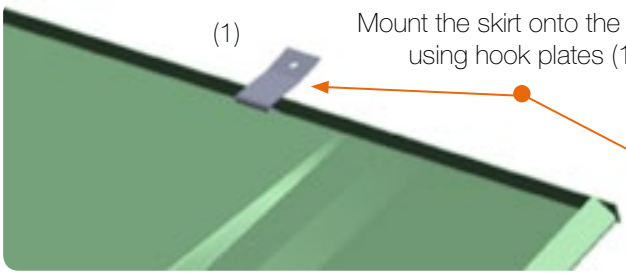
Installation phases 4.0

INSTALLING LATERAL WATERPROOFING SKIRTS

Position the lateral waterproofing skirts overlapping the rims on the right and left edges of the integration system.

Install a self-tapping screw on the join between two skirts. Screw it through the mounting plate rims, into a batten or purlin.





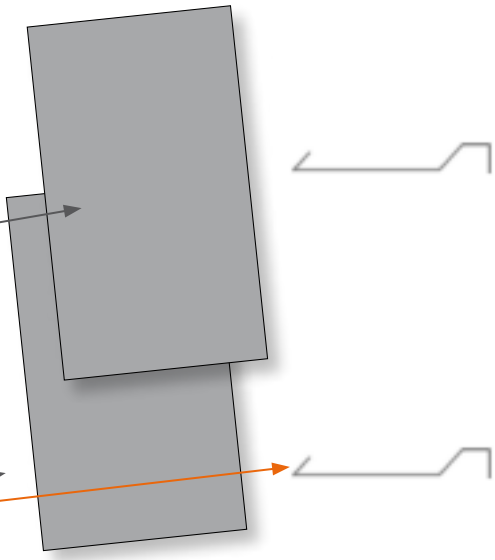
Mount the skirt onto the batten using hook plates (1).

The skirts plug into each other.

1) Open the lateral clip over 10 to 15 cm (lower skirt).
2) Plug in the upper skirt.
3) Mount the skirt on the rim while maintaining pressure.
4) Fold the clip.

Upper skirt plugs onto the lower skirt.

Open the lateral clip over 10 to 15 cm. Position and install the upper skirt and clip, and close the clip.

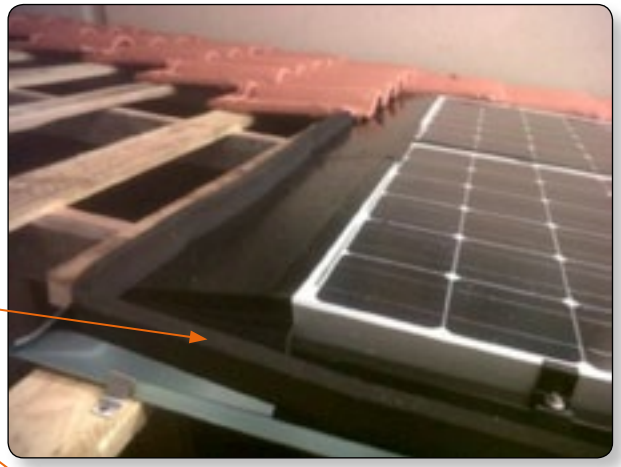


Adjacent lateral skirts should overlap by 15 cm.

Installation phases 4.1

INSTALLING THE PRECOMPRESSED SEAL

PLACE THE PRECOMPRESSED SEAL ON THE LATERAL EDGE JOINERS, **UNTIL THE WATERPROOFING STRIP IS ENTIRELY COVERED.**

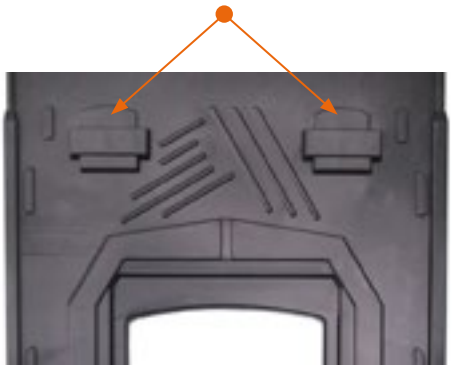


The precompressed seal should be placed as close as possible to the edge joiner clip.

Installation phases 5.0

INSTALLING THE PHOTO-VOLTAIC PANELS

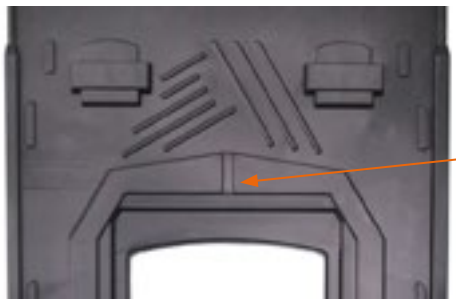
Place the first row of panels on the mounting plates.
The panel is installed on the 2 upper studs.



PASSING THE CABLES (1)

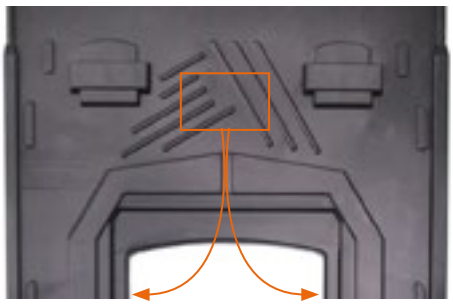
Note :
Cables must transit from one panel to the next through the dedicated cable outlets:
Slot through the central protection pad.

1



(2)
PASSING THE
CABLES

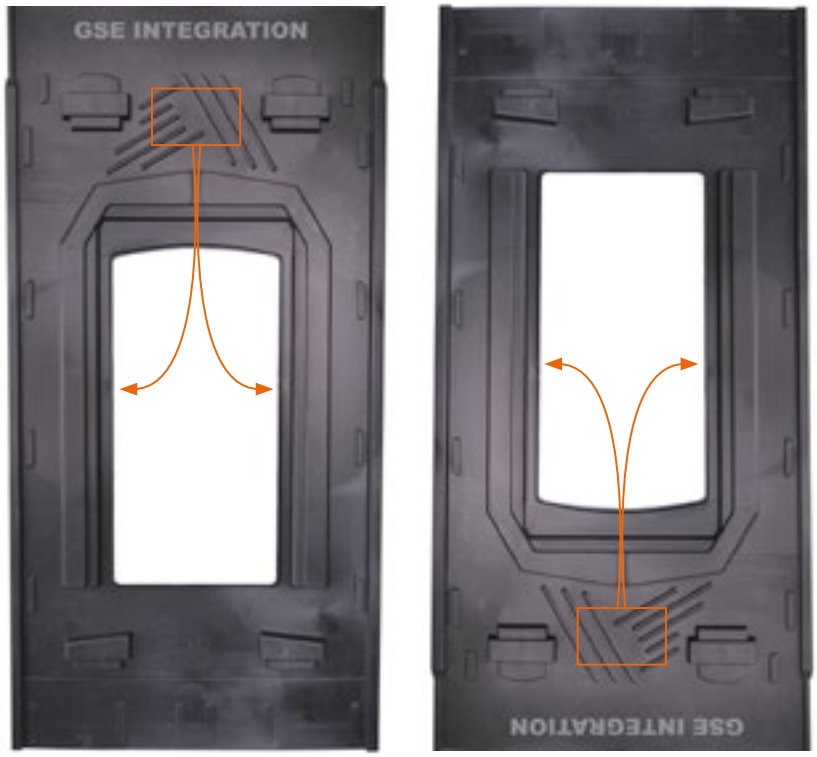
2



Installation phases 6.0

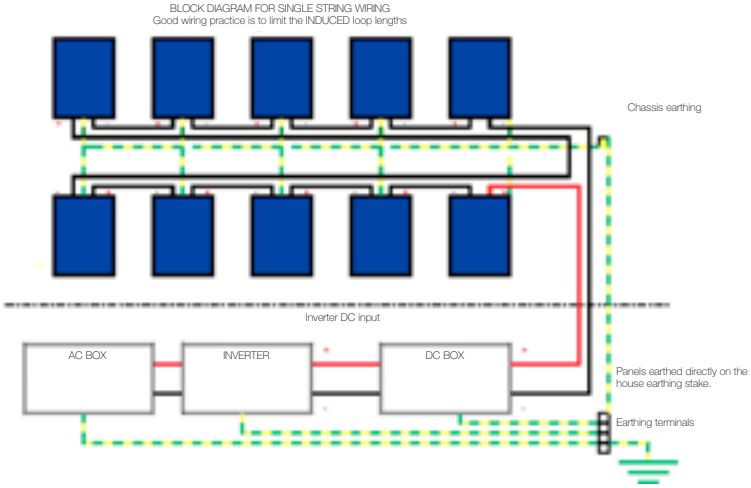
PASSING THE CABLES (2)

Panels should be connected horizontally when installed in portrait format.
The panel can be installed upright or inverted.



ELECTRICALLY EARTHING THE PANELS

The photo-voltaic panel should be earthed through the dedicated hole in alloy frame of the photo-voltaic panel


BLOCK DIAGRAM FOR SINGLE STRING WIRING
Good wiring practice is to limit the INDUCED loop lengths
Chassis earthing
Inverter DC input
AC BOX
INVERTER
DC BOX
Panels earthed directly on the house earthing stake.
Earthing terminals

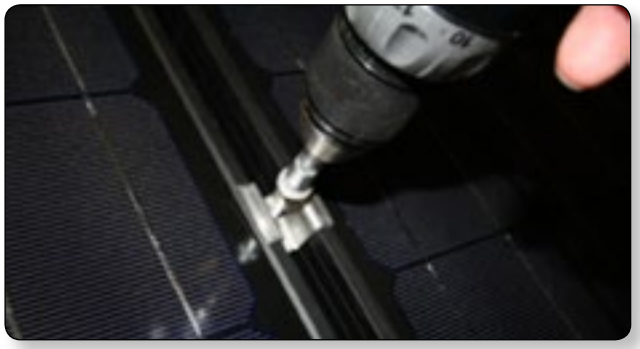
Installation phases 7.0

MOUNTING THE PHOTO-VOLTAIC PANELS (1)

Mount the panels in pairs, using the dual clamps. **Install the EPDM seal,** supplied with the screw, and the washer, under the clamp, so that the assembly is waterproof when tightened *(see page 11)*

Mount the single clamps through the lateral skirts, aligned with the dual clamps already installed. Use self-tapping screws with washers. **Install the EPDM seal,** supplied with the screw, and the washer, under the clamp, so that the assembly is waterproof when tightened *(see page 11)*

The clamps MUST be mounted on a batten or purlin.



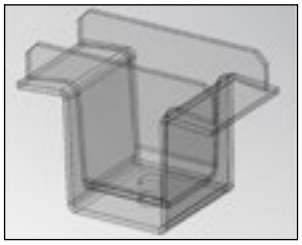
Depending on the battens (and their spacing) on which the clamps are being mounted, space the clamps as evenly as possible in relation to the size of the mounting plate.
The clamp should be mounted between 1/5 (minimum) and 1/3 (maximum) from the edge of the panel.

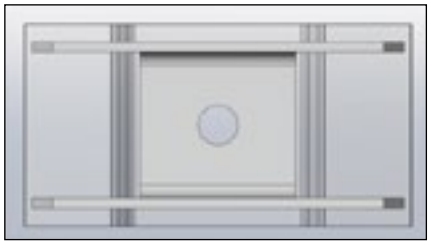
MOUNTING THE PHOTO-VOLTAIC PANELS (2)

The number of clamps required depends on the climatic zone of the installation.

Region with Wind NV65	Quantity of standard clamps	Quantity of special clamps
I	4	/
II	4	/
III	4	/
IV	4	/
V	4	/

For zones with stronger winds, a strengthener should be incorporated for each clamp. In this case, 4 reinforced clamps are sufficient (specify when ordering)



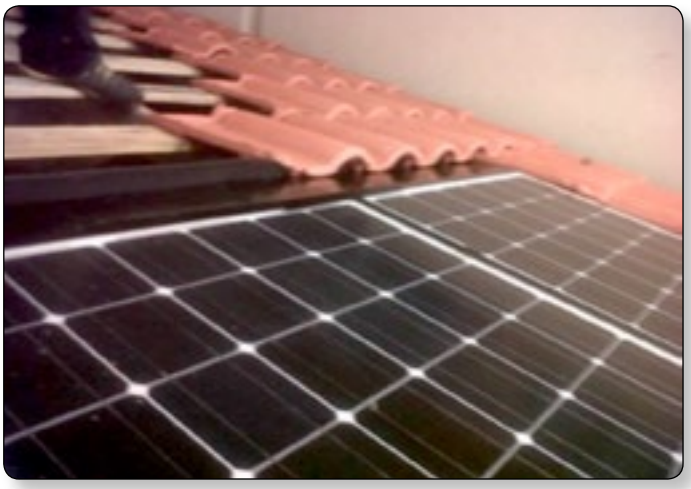


Installation phases 8.0

INSTALLING THE TOP EDGE JOINERS

The roof ridge edge joiner cannot be installed if the ridge interferes with the installation, or if there is reverse slope due to panel thickness and a shallow slope on the roof (see recommendation on page 26).
In this case, the ridge edge joiner should be replaced by a waterproofing strip (see recommendation on page 21).

SEE CSTB TEST « COMBINED WIND/RAIN WITHOUT SEAL AND WITHOUT RIDGE EDGE JOINER ».



REPLACING THE RIDGE EDGE JOINER BY A WATERPROOFING STRIP

Install the precompressed seal

When installing the precompressed seal on the lateral edge joiners,
the flashing strip must be entirely covered.

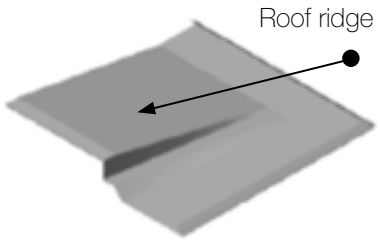
Installation phases 8.1

INSTALLING THE TOP EDGE JOINERS

Mount the corner bead at the correct height (see page 22), then position the central edge joiner. Position the angle edge joiner so that one side overlaps the central edge joiner and the other side overlaps the lateral skirts (vertically) by at least 100 mm.

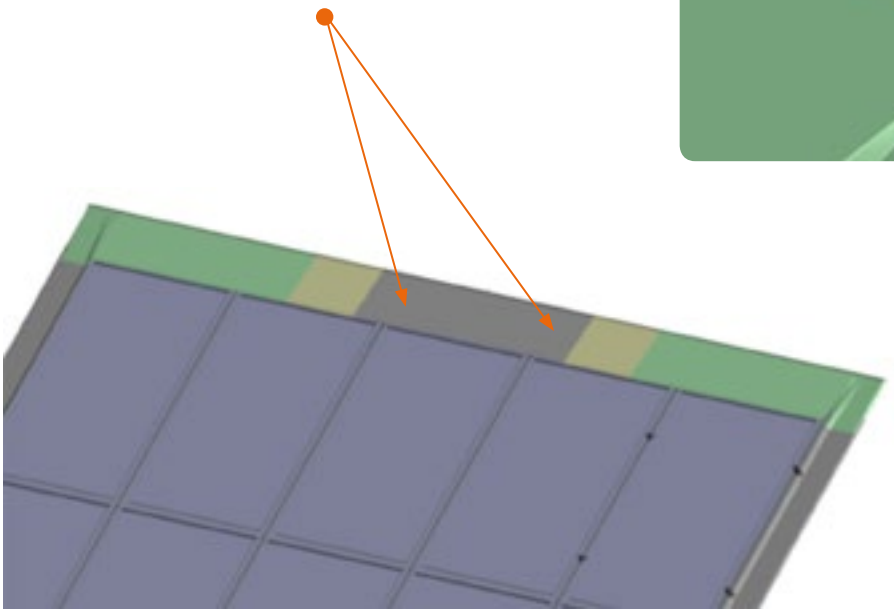
Join the two edge joiners using the « Ridge joiner » roofing plate, 400 mm wide, over the two mounting plates. Apply two vertical beads of PU adhesive on each side of the « Ridge joiner » plate, to ensure that the roofing is waterproof.

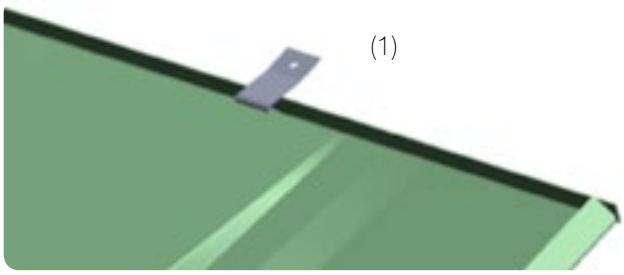
Mount the ridge edge joiners and the lateral edge joiner using the mounting hook plates (1), which should be screwed onto a strip or a lath.

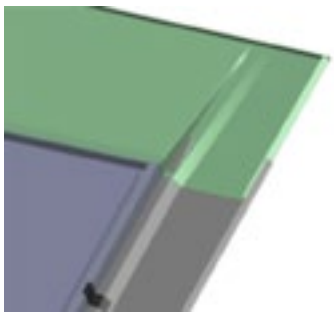


The angle edge joiner provides the junction with the central edge joiner, overlapping it by at least 100 mm. Apply two vertical beads of PU adhesive to ensure that the roofing is waterproof.

Apply 2 seals of PU adhesive between the ridge junction (on each side) and the central ridge







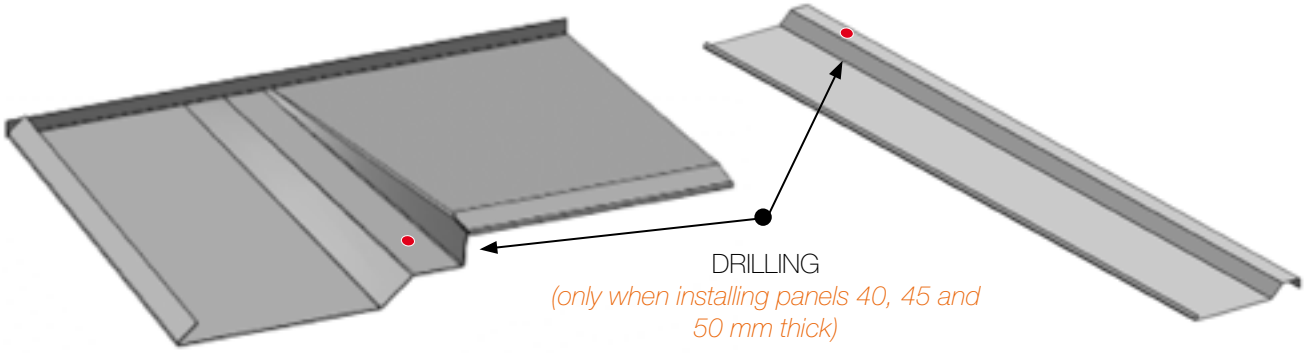
Installation phases 8.2

UNIVERSAL RIDGE ANGLE

Recommended installation as a function of the various panel thicknesses

Note: The new universal ridge angle forms a join by overlapping the central edge joiner.
No specific recommendation for installing on panels 35 mm thick

Follow the instructions below to install the new angle edge joiner on photo-voltaic panels 40, 45 and 50 mm thick.

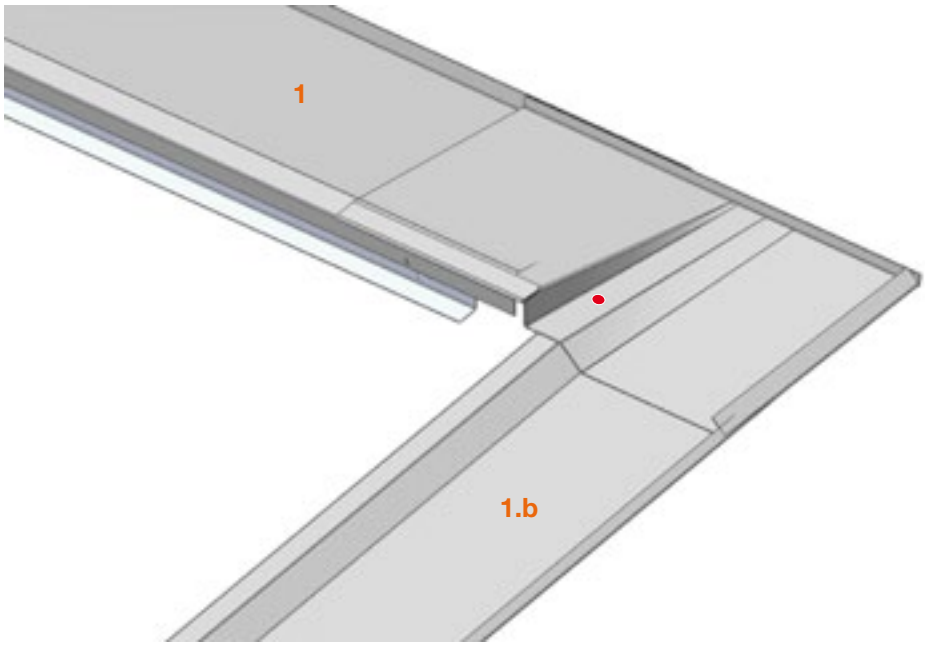


DRILLING
(only when installing panels 40, 45 and 50 mm thick)

Drill an 8 mm hole in the angle and the first lateral edge joiner

---

After drilling the two holes **1**, insert the screw with a washer **2**.



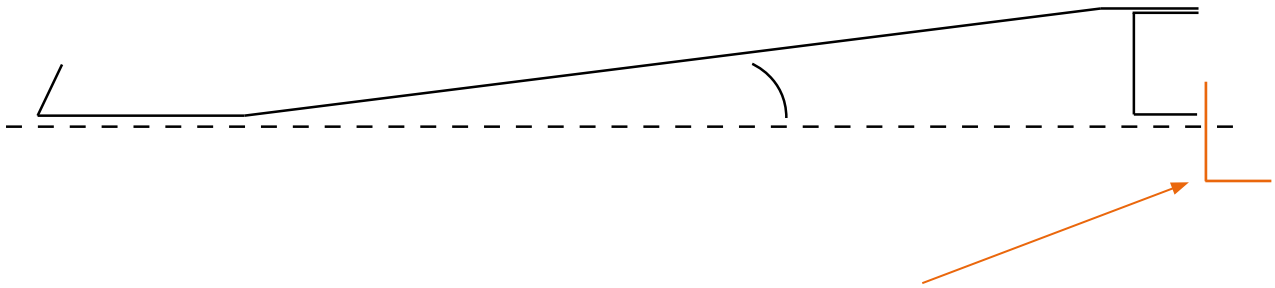
2. Screw and washer

3. EPDM washer
or packing shim seal

Under these two elements[1],
install an EPDM washer[3] (screw it onto the screw) which will provide 5 mm packing.
To install the angle on a panel of:
- 40 mm: install 1 shim[3] / 45 mm: install 2 shims[3] / 50 mm: install 3 shims[3]

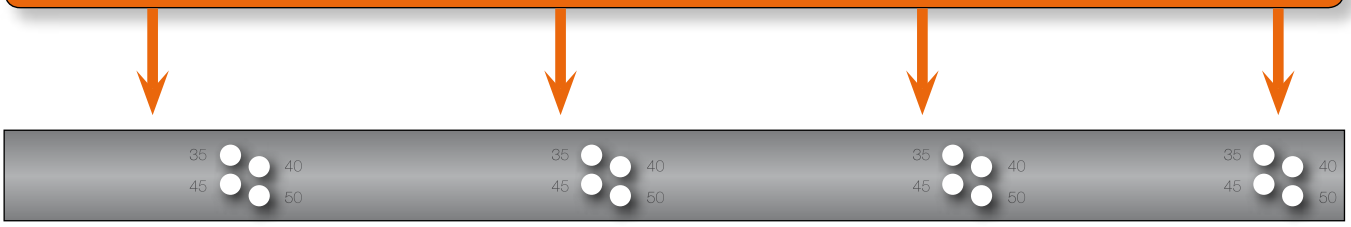
Installation phases 8.3

UNIVERSAL CENTRAL EDGE JOINER



Corner bead

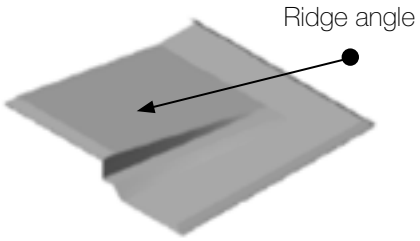
Use the pop rivets supplied with the kit and mount the corner bead on the central edge joiner. Each hole corresponds to a panel thickness. The first hole is used when installing the central edge joiner with panels 50 mm thick, the second hole for 45 mm panels, the third hole for 40 mm panels and the last hole for 35 mm panels.



Corner bead front view

IMPORTANT !

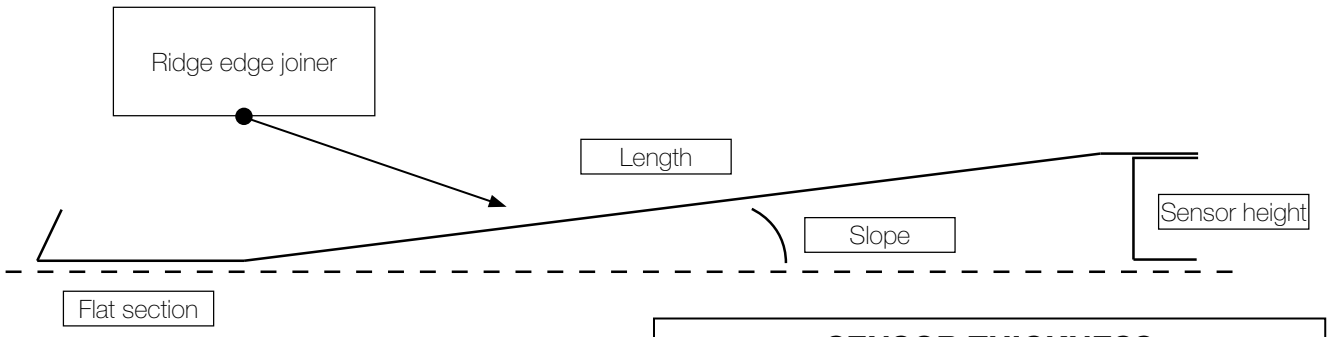
The angle edge joiner provides the junction with the central edge joiner, overlapping it by at least 100 mm. Apply two vertical beads of PU adhesive to ensure that the roofing is waterproof.



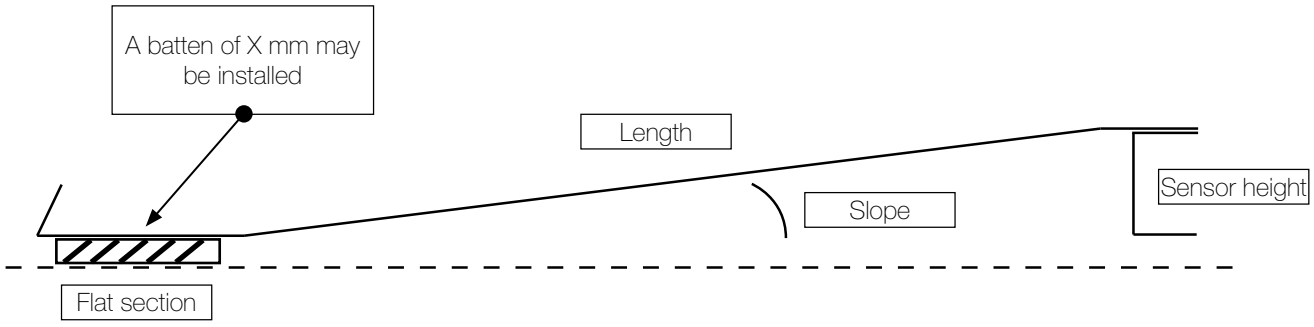
Installation phases 8.4

MINIMUM ROOF SLOPE FOR INSTALLING RIDGE EDGE JOINERS, AS A FUNCTION OF THE THICKNESS OF THE PV PANELS.

SLOPE OF RIDGE EDGE JOINER MUST NOT BE LESS THAN 2°



	SENSOR THICKNESS			
	35	40	46	50
MINIMUM ROOF SLOPE (°)	17	18	20	21
PENTE DE TOIT MINIMUM (%)	31%	33%	37%	39%



3 mm BATTEN

	SENSOR THICKNESS			
	35	40	46	50
MINIMUM ROOF SLOPE (°)	17	18	20	21
MINIMUM ROOF SLOPE (%)	31%	33%	37%	39%

6 mm BATTEN

	SENSOR THICKNESS			
	35	40	46	50
MINIMUM ROOF SLOPE (°)	17	18	20	21
MINIMUM ROOF SLOPE (%)	31%	33%	37%	39%

This information is only a guide.
Care should be taken to ensure that all roofing regulatory requirements are met.

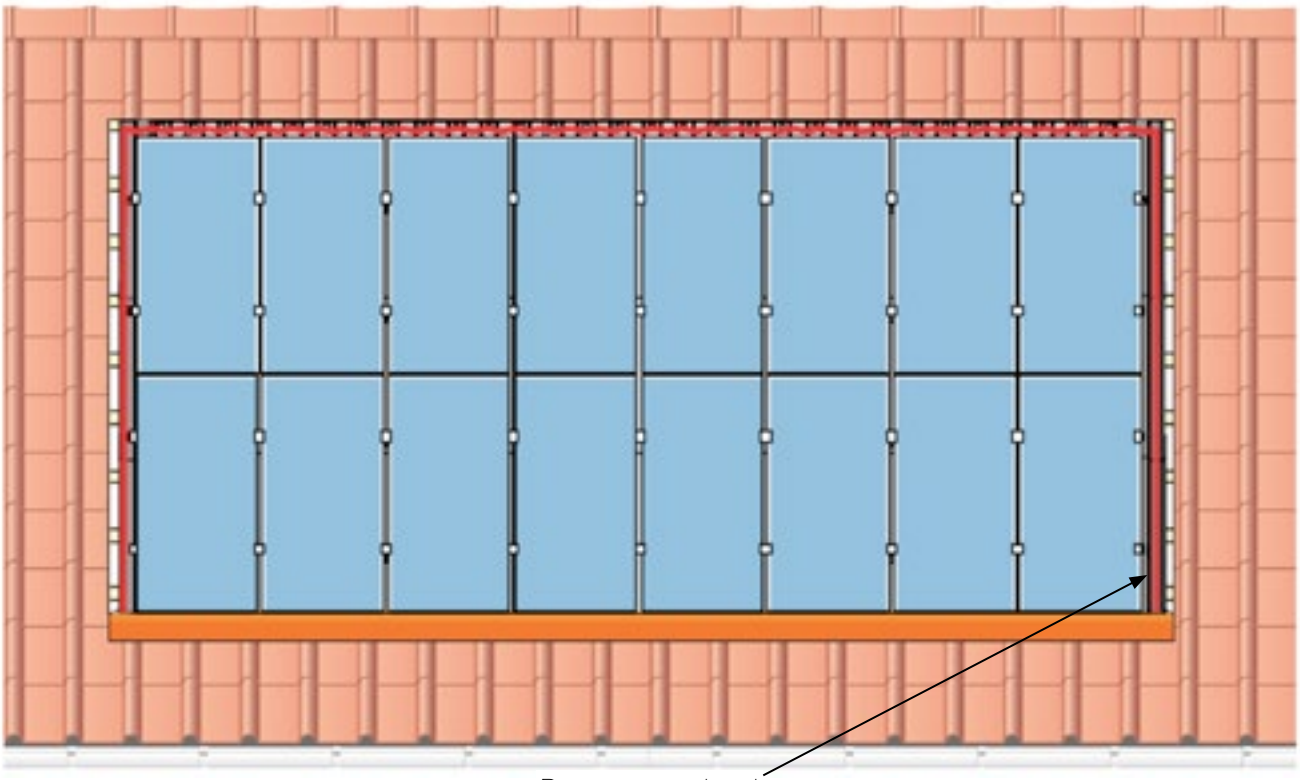
Installation phases 9.0

INSTALLING THE PRECOMPRESSED SEAL (recommended size : L 20mm / H 40mm)

11.1) Unroll the precompressed seal over the entire height of the lateral skirts **up to covering the waterproofing strip (bottom of installation).**

11.2) Unroll the precompressed seal over the entire width of the ridge edge joiners.

11.3) The edges of the two seals form a butt join (no overlapping).

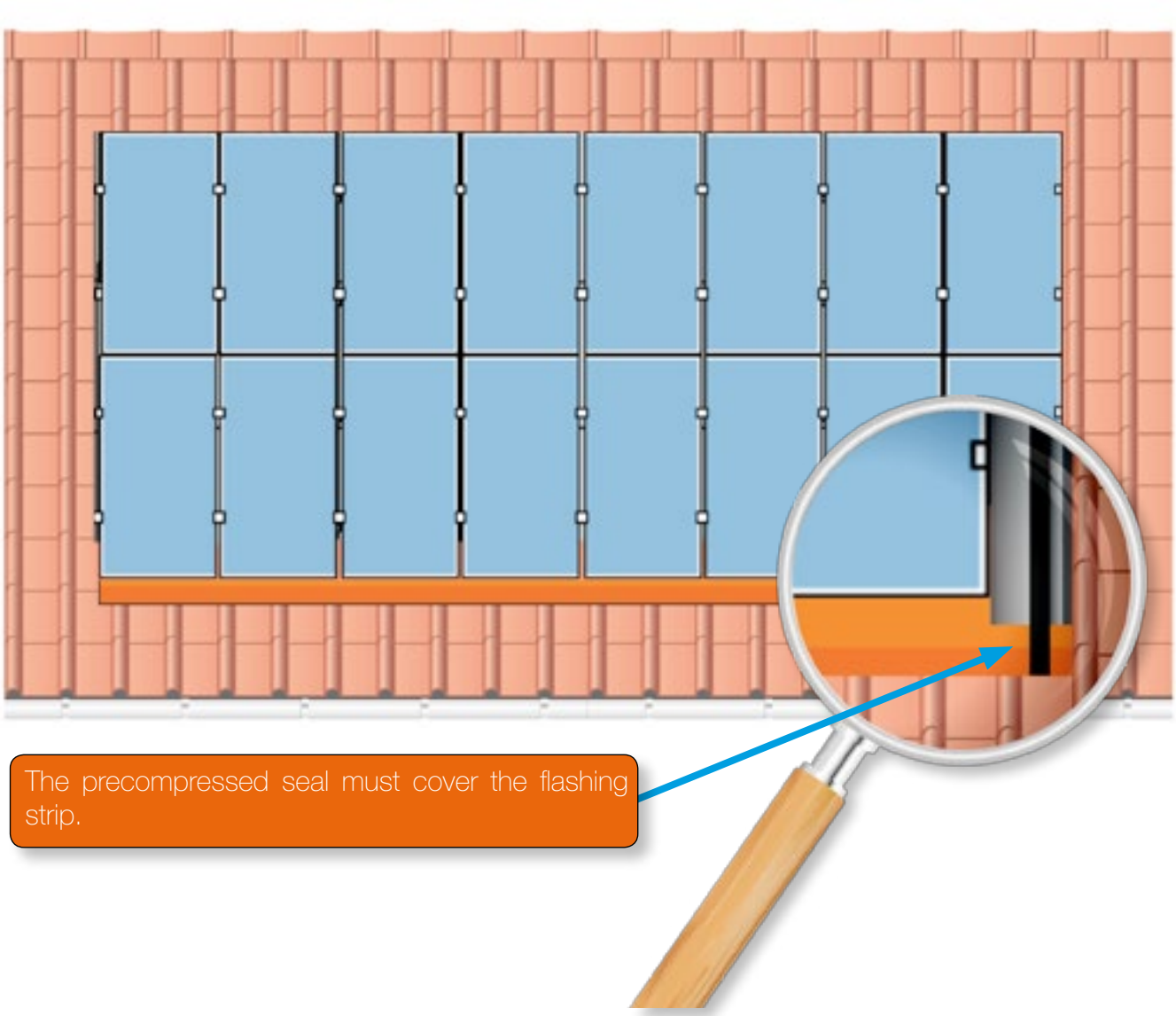


Installation phases 9.1

FINISHING THE PHOTO-VOLTAIC FIELD

12.1) Install the additional rows of tiles (or slates) that were initially removed in the lateral zone and at the top.

12.2) Cut the tiles if necessary.



Servicing

INSPECTION

It is important to check once per year whether any leaves or other elements have penetrated under the photovoltaic system. Such elements can be blown out using a compressed air blower. Do not use solvent to clean the mounting plates, which are in polypropylene.

It is recommended that you offer your customers a maintenance contract, which would include an annual inspection of: generation, electrical system, panels, panel mounting plates, mountings, precompressed seals, waterproofing strip.

REPLACING A MODULE

1) Remove the clamps from the panel to be replaced.
2) Disconnect the earthing connection and disconnect it from the string.
3) Remove the panel being replaced and position the new panel.
4) Connect the new panel to earth and to the string.
5) Mount the clamps.

The equipotential connection must be maintained

Assistance

TRAINING

Training courses are held on the first Monday of every month (76380 Canteleu).

Specific training may be provided if requested by a sufficient number of persons.

For any question, please contact your sales manager and/or distributor.

TECHNICAL DEPARTMENT / ASSISTANCE DEPARTMENT

**TECHNICAL ASSISTANCE IS AVAILABLE,
MONDAY TO FRIDAY, 8 am to 6 pm**

SOLUTION ENERGIE
PÔLE TECHNIQUE

16 QUAI GUSTAVE FLAUBERT 76380 CANTELEU
Tél. 02 32 10 77 60
Mail : **technique@gseintegration.com**

Contact

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Your distributor :

Examples of completed installations

Examples of completed installations

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